Mr. Michael T. Davis Pre-Calculus	Unit 2 Practice Test – Units 2.1 thru 2.8 January 19, 2016

Name: Solutions

Directions: In order to receive full credit, you must show all relevant work. Give all irrational solutions in simplified radical form.

1. Factor $x^2+6x-27$

$(x+9)(x-3)$

2. Solve $x^2+36=0$ for all solutions (real and imaginary)

$x^2=-36 \quad \sqrt{x^2}=\pm\sqrt{-36} \quad x=\pm i\sqrt{36} \Rightarrow x=\pm 6i$

$\{6i,-6i\}$

3. Solve $6m^2-24m=0$ for all solutions (real and imaginary)

$6m(m-4)=0$

$6m=0 \quad m-4=0$

$m=0 \quad m=4$

$\{0,4\}$

4. Solve $3y^3-24y=0$ for all solutions (real and imaginary)

$3y(y^2-8)=0$

$3y=0 \quad y^2-8=0 \quad y^2=8 \quad y=\pm\sqrt{8} \quad y=\pm 2\sqrt{2}$

$y=0$

$\{0,2\sqrt{2},-2\sqrt{2}\}$

5. Factor $9x^2-64$

$(3x-8)(3x+8)$

6. Solve $3x^2-5x-28=0$ for all solutions (real and imaginary)

$(3x+7)(x-4)=0$

$3x+7=0 \quad x-4=0$

$x=-\frac{7}{3} \quad x=4$

$\{-\frac{7}{3},4\}$

7. Factor y^3-8k^3

$(y-2k)(y^2+2ky+4k^2)$

8. Factor $2y^3 - 12y^2 - 32y$

$2y(y^2 - 6y - 16) = 2y(y-8)(y+2)$

9. Solve $x^4 + 2x^2 - 63 = 0$ for all solutions (real and imaginary)

$(x^2+9)(x^2-7) = 0$

$x^2+9=0 \quad x^2=-9 \quad x=\pm\sqrt{-9} \quad x=\pm 3i$

$x^2-7=0 \quad x^2=7 \quad x=\pm\sqrt{7}$

$\{3i, -3i, \sqrt{7}, -\sqrt{7}\}$

10. Solve $x^3 + 3x^2 - 18x - 40 = 0$ for all solutions (real and imaginary) (Hint: $x+2$ is one factor of the polynomial)

$-2 \mid 1 \quad 3 \quad -18 \quad -40$

$\quad\quad -2 \quad -2 \quad 40$

$1 \quad 1 \quad -20 \quad 0 = \text{Remainder}$

$x^2 + x - 20 = 0 \quad (x+5)(x-4) = 0$

$\{-2, -5, 4\}$

11. Solve $x^3 - 7x^2 - 8x + 56 = 0$ for all solutions (real and imaginary)

$x^2(x-7) - 8(x-7) = 0$

$(x-7)(x^2-8) = 0 \quad x^2-8=0 \quad x^2=8$

$x-7=0 \quad x=7 \quad x^2=\pm\sqrt{8} \quad x^2=\pm 2\sqrt{2}$

$\{7, 2\sqrt{2}, 2\sqrt{2}\}$

12. A polynomial function of degree 3 has the solution set $\{0, -3, 7\}$. Determine an equation of the function in standard form.

$x=0 \quad x=-3 \quad x=7$

$x=0 \quad x+3=0 \quad x-7=0$

$x(x+3)(x-7) = 0 \quad x(x^2-4x-21) = 0 \quad x^3 - 4x^2 - 21x = 0$

13. A polynomial function of degree 3 has the solution set $\left\{-4, \frac{-2}{3}\right\}$ given that -4 is a double root. Determine an equation of the function in standard form.

$x=-4 \quad x=-4 \quad x=\frac{-2}{3}$

$x+4=0 \quad x+4=0 \quad 3x=-2$

$3x+2=0$

$(x+4)(x+4)(3x+2) = 0$

$(x^2+8x+16)(3x+2) = 0$

$3x^2 + 26x^2 + 64x + 32 = 0$

14. Write an equation in standard form for the degree 2 polynomial function with the given solution set $\{\sqrt{11}, -\sqrt{11}\}$ $x = \sqrt{11}$ $x = -\sqrt{11}$

$(x-\sqrt{11})(x+\sqrt{11}) = 0$

$x^2 + \sqrt{11}x - \sqrt{11}x - \sqrt{121} = 0$

$x^2 - 11 = 0$

15. Write an equation in standard form for the degree 3 polynomial function with the given solution set $\{0, 4i, -4i\}$

$x = 0$ $x = 4i$ $x = -4i$ $x(x^2+16) = 0$

$x(x-4i)(x+4i) = 0$ $x^3 + 16x = 0$

16. Simplify $\frac{8y}{7} - \frac{y+28}{7}$ $= \frac{8y-y-28}{7} = \frac{7y-28}{7} = y-4$

17. Simplify: $\frac{3\cdot(w+4)}{3\cdot 24} + \frac{(w-1)4}{(18)4}$ LCD: 72

$\frac{3w+12}{72} + \frac{4w-4}{72} = \frac{3w+12+4w-4}{72} = \frac{7y+8}{12}$

18. Simplify $\frac{5}{x} - \frac{3}{x+2}$ $= \frac{(x+2)}{(x+2)}\frac{5}{x} - \frac{x\cdot 3}{x\cdot(x+2)} = \frac{5x+10}{x(x+2)} - \frac{3x}{x(x+2)}$

$\frac{5x+10-3x}{x^2+2x} = \frac{2x+10}{x^2+2x}$

19. Simplify: $\frac{x^2-2}{x^2} + \frac{3-2x}{6x}$ $= \frac{6\cdot(x^2-2)}{6\cdot x^2} + \frac{x\cdot(3-2x)}{x\cdot 6x} = \frac{6x^2-12}{6x^2} + \frac{3x-2x^2}{6x^2}$

$= \frac{6x^2-12+3x-2x^2}{6x^2} = \frac{4x^2+3x-12}{6x^2}$

20. Simplify $\frac{2}{7x^2y} + \frac{3}{2xy^2}$ $= \frac{2y\cdot 2}{2y\cdot 7x^2y} + \frac{7x\cdot 3}{7x\cdot 2xy^2} = \frac{4y}{14x^2y^2} + \frac{21x}{14x^2y^2}$

$\frac{4y+21x}{14x^2y^2}$

21. Solve $\frac{4}{6}=\frac{2w}{21}$ $\frac{4}{6}=\frac{2y}{21}$ $21\cdot\frac{2}{3}=\frac{2y}{21}\cdot 21$ $7\cdot 2=2y$

$7=y$ $\{7\}$

22. Solve $\frac{6}{x+2}=\frac{9}{x+3}$ $(x+3)(x+2)\frac{6}{x+2}=(x+3)(x+2)\frac{9}{x+3}$ $(x+3)\cdot 6=(x+2)9$

$6x+18=9x+18$ $6x=9x$ $0=3x$ $0=x$

$\{0\}$

23. Solve $\frac{9}{10}-y=\frac{4y}{5}$ $10\cdot\frac{9}{10}-10\cdot y=10\cdot\frac{4y}{5}$ $9-10y=2\cdot 4y$

$9-10y=8y$ $9=18y$ $\frac{1}{2}=y$ $\{\frac{1}{2}\}$

24. Solve $\frac{21}{h^2}-1=\frac{4}{h}$ $h^2\frac{21}{h^2}-h^2\cdot 1=h^2\cdot\frac{4}{h}$ $21-h^2=4h$

$0=h^2+4h-21$ $0=(h+7)(h-3)$

$h+7=0$ $h-3=0$

$h=-7$ $h=3$ $\{-7,3\}$

25. Solve. $1+\frac{2}{y}=\frac{4}{y-3}$

$y(y-3)1+y(y-3)\frac{2}{y}=y(y-3)\frac{4}{y-3}$ $y^2-3y+2y-6=4y$

$y^2-y-6=4y$ $y^2-5y-6=0$ $(y-6)(y+1)=0$ $\{6,-1\}$

26. Solve $\frac{2}{x+1}-\frac{1}{x}=\frac{1}{6}$ $6x(x+1)\frac{2}{x+1}-6x(x+1)\frac{1}{x}=6x(x+1)\frac{1}{6}$

$6x\cdot 2-6(x+1)=x(x+1)$ $12x-6x-6=x^2+x$

$6x-6=x^2+x$ $0=x^2-5x+6$ $0=(x-2)(x-3)$

$\{2,3\}$